

(12) **UK Patent Application** (19) **GB** (11) **2 214 729** (13) **A**  
 (43) Date of A publication 06.09.1989

(21) Application No 8826260.5

(22) Date of filing 09.11.1988

(30) Priority data  
 (31) 8726198 (32) 09.11.1987 (33) GB

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(51) INT CL<sup>4</sup>  
 H01R 13/73 25/00

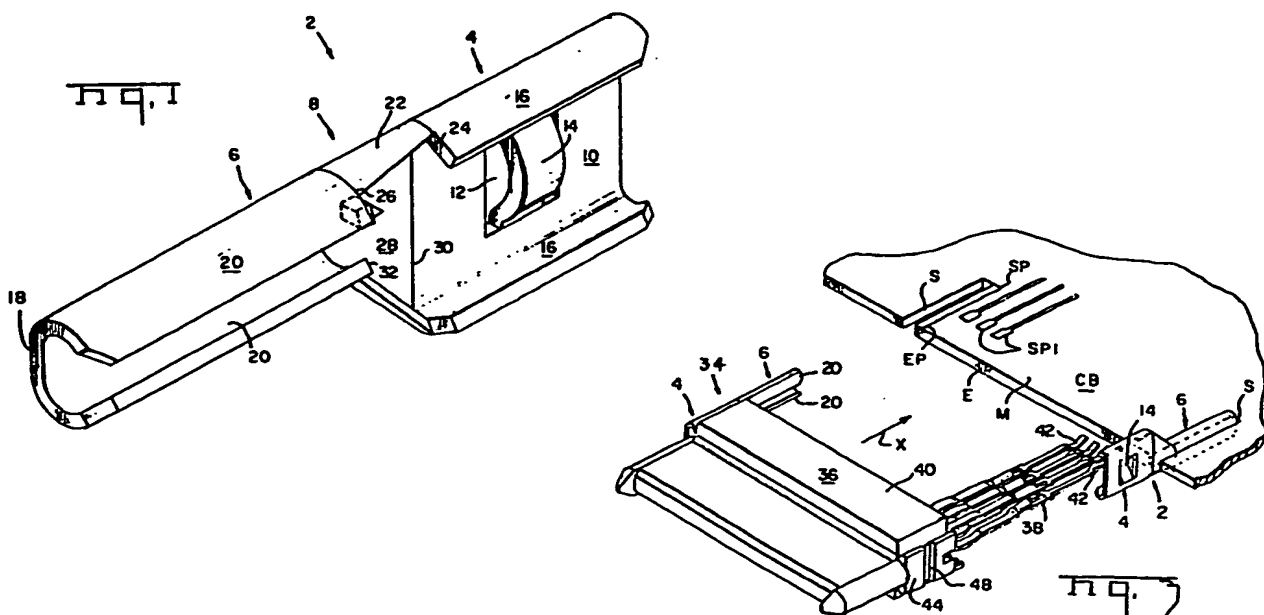
(52) UK CL (Edition J)  
 H2E EDCN E221 E226  
 U1S S2087

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(58) Field of search  
 UK CL (Edition J) H2E EDCN EDCU EEKH EHBA  
 EHBB E221 E224 E226 E229  
 INT CL<sup>4</sup> H01R, H05K

(54) **Securing an insulating housing of an electrical connector to a circuit board**

(57) An insulating housing (36) of an electrical connector (34) is secured to a circuit board (CB) by means of a pair of stamped and formed metal fasteners (2) each comprising a first clip (4) which embraces a lateral projection (44) on a housing (36) of a printed circuit edge connector (34) and has a lateral latching strap (14) engaging in a slot (48) in the projection (44). Each fastener (2) also comprises a second clip (6) which is of C-shaped cross section and which engages in a slot (S) in a margin (M) of the board (CB), arms (20) of the second clip (6) engaging solder pads (SP) on edge portions (EP) of the slot (S). The clips (6) are soldered to the board (CB) by means of solder on the solder pads (SP).



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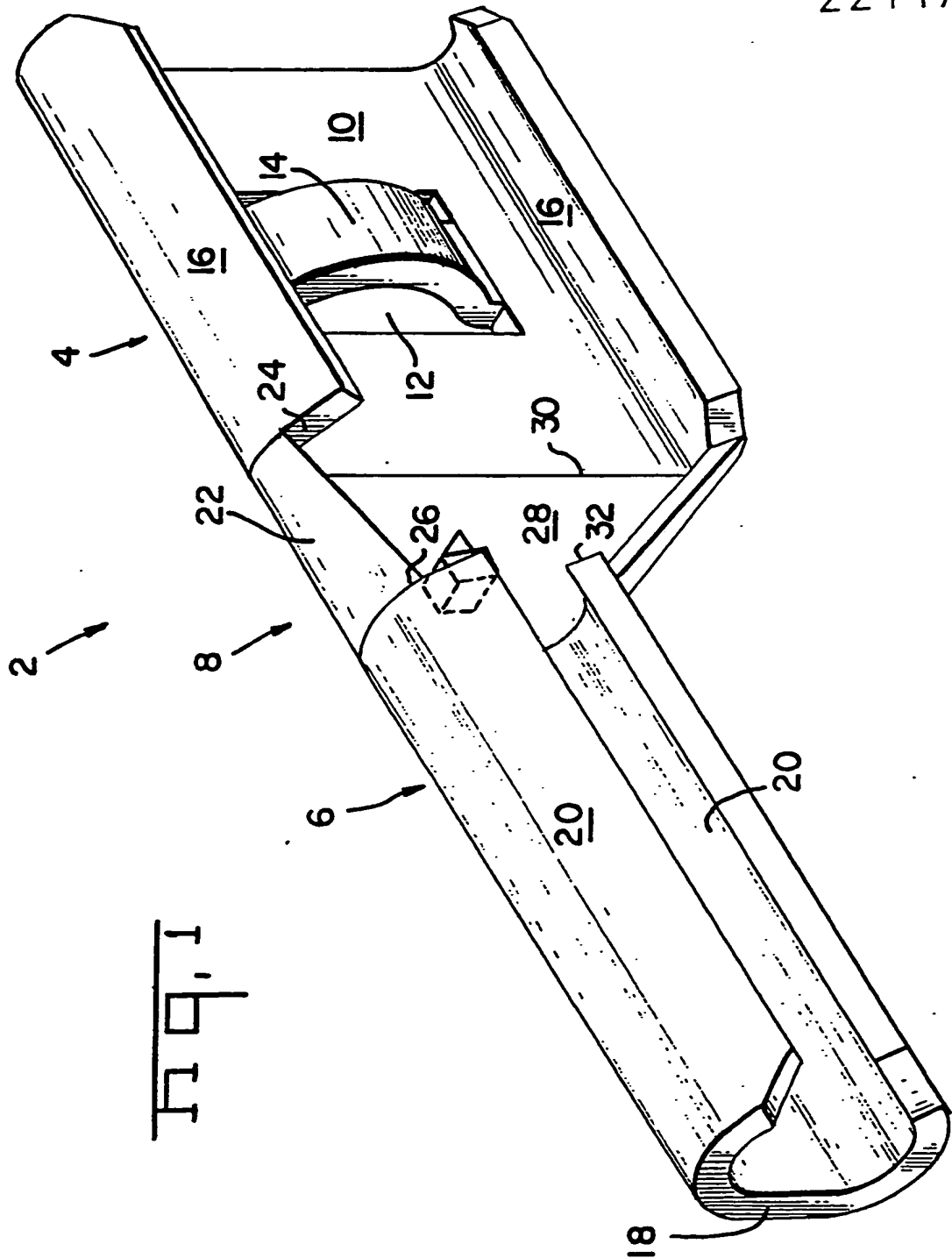


Fig. 1

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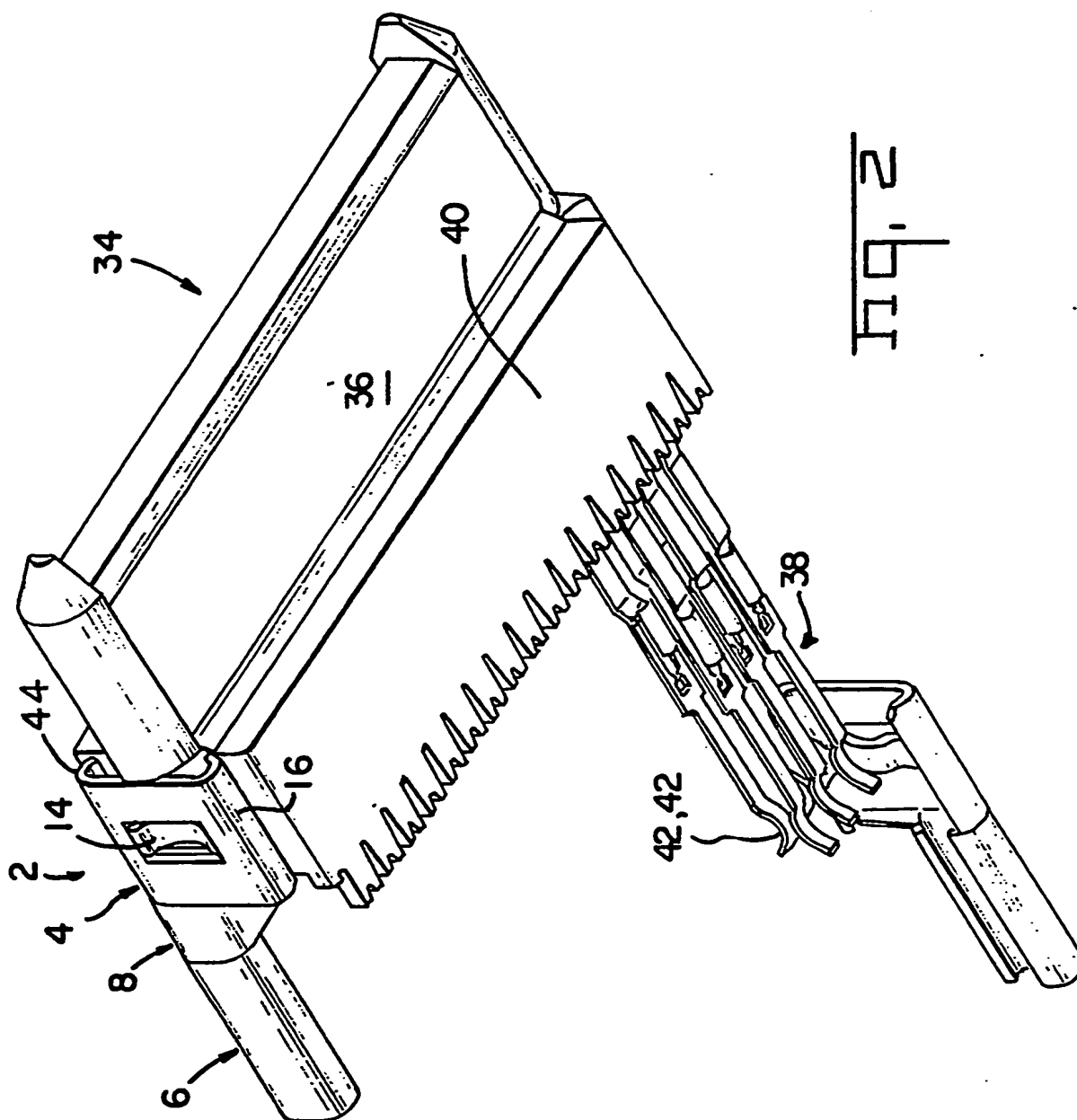
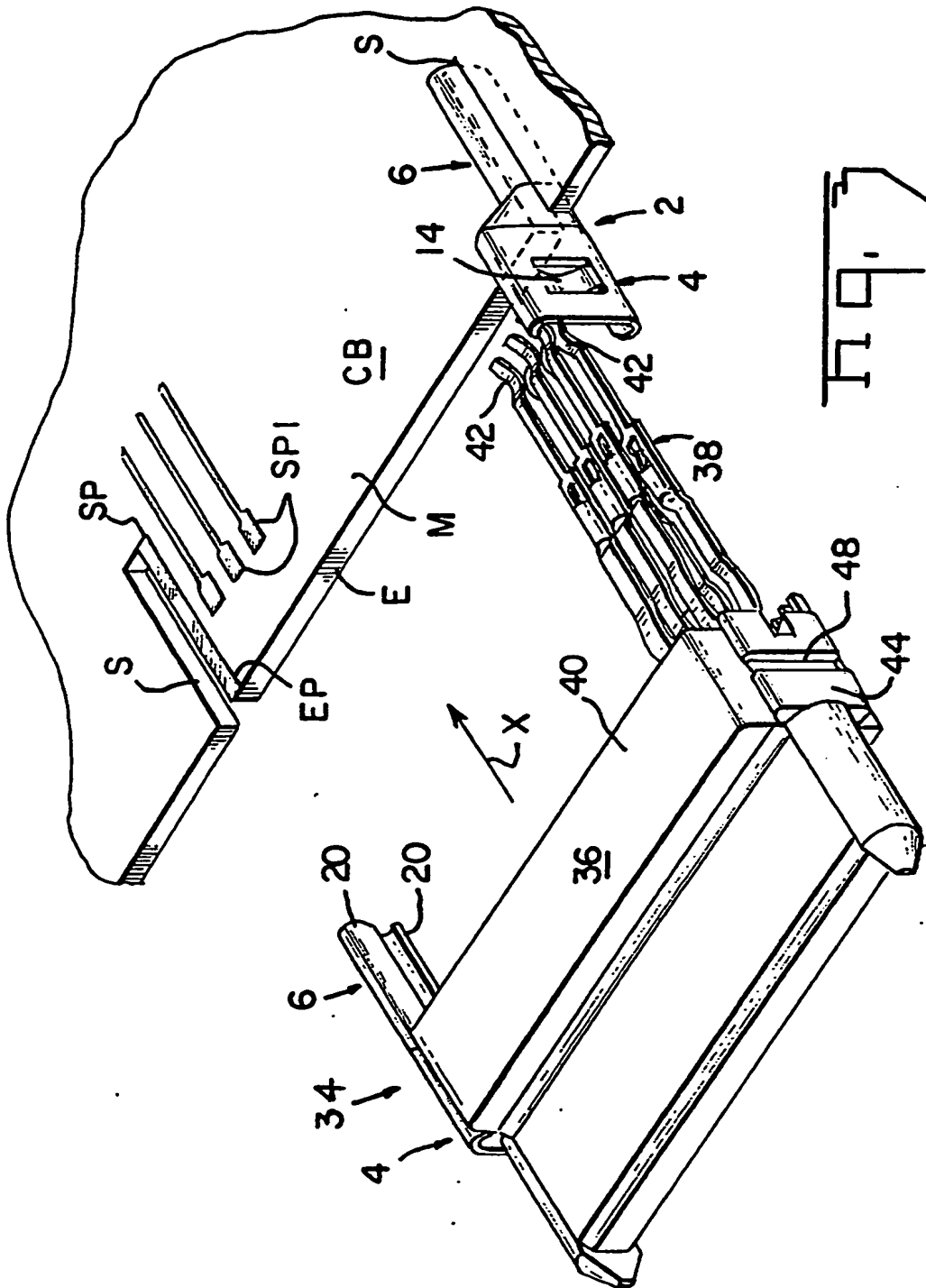


Fig. 2

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SECURING AN INSULATING HOUSING AN ELECTRICAL  
CONNECTOR TO A CIRCUIT BOARD

This invention relates to a fastener for mechanically securing an insulating housing of an electrical connector to a margin of a printed circuit board, and to an assembly comprising a printed circuit edge connector and a circuit board to a margin of which the connector has been secured.

According to one aspect of the invention, a stamped and formed metal fastener for mechanically securing an insulating housing of an electrical connector to a margin of a printed circuit board, comprises a first clip adapted to be engaged about a laterally projecting part of the housing and having a latching portion which can be resiliently or permanently deformed into an opening into said projecting part to secure the clip to the housing; and a second clip extending rectilinearly from the first clip for insertion in a slot in said margin to grip an edge portion of the slot.

The first clip may comprise a flat base, from opposite edges of which project curled-over ears for gripping the projecting part of the housing, the base being formed with a central strap, which constitutes said latching portion and bridges a through-opening in said base, the second clip being of substantially C-shaped cross section and extending from the first clip in the axial direction of the curled over ears. One arm of the C cross section second clip may be formed as an extension of one of the curled-over ears of the first clip.

According to another aspect of the invention, in an assembly comprising a printed circuit edge connector having an insulating housing and a printed circuit board, the housing of the connector receiving a margin of the circuit board, the housing has at each end thereof, a laterally projecting part, each projecting part being secured to said margin by means of a metal fastener, each

fastener comprising a first clip embracing and being secured to said projecting part by means of a latching portion of the first clip which engages in an opening in said projecting part, the fastener further comprising a  
5 second clip formed integrally with the first clip and being of C-shaped cross section and thus comprising a pair of arms, the arms of each second clip engaging about an edge portion of a slot formed in said margin, at least one of said arms being soldered to said margin.

10 The connector may be supplied to its end user, with the fasteners thereon, so that the end user can very easily secure the connector to the circuit board, by inserting each second clip into a respective slot in the margin thereof so that at least one of said arms engages a  
15 solder pad extending longitudinally of the slot, and by then soldering the arm or arms to the circuit board by means of a solder pad or solder pads.

For a better understanding of the invention and to show how it may be carried into effect, reference will  
20 now be made by way of example to the accompanying drawings in which:

FIGURE 1 is a greatly enlarged isometric view of a fastener for use in securing a printed circuit board edge connector to a margin of a printed circuit board;

25 FIGURE 2 is an isometric view, shown partially exploded form, of the connector, when provided with fasteners for securing it to the margin of the circuit board; and

FIGURE 3 is an exploded, isometric view of the  
30 connector when secured to the board by means of the fasteners.

As shown in Figure 1, a fastener 2 which has been stamped and formed from a single piece of sheet metal stock, comprises a first clip 4 connected to a second clip  
35 6 by a transition portion 8 of the fastener 2.

The clip 4 comprises a flat base 10 having a central rectangular through opening 12 therein, opposite edges of which are bridged by a latching portion in the form of an arcuate, resilient strap 14 extending transversely of the length of the base 10. From opposite edges of the base 10, parallel to said opposite edges of the opening 12, extend, longitudinally of the base 10, curled-over ears 16 which are of equal dimensions.

The clip 6, which is elongate and is of constant C-shaped cross section, comprises a base 18 from each of two opposite longitudinal edges of which extends a resilient arm 20.

The transition portion 8, which tapers from the clip 4 towards the clip 6, comprises a first portion 22 which connects the adjacent edge 24 of one of the ears 16 to the adjacent edge 26 of one of the arms 20, and a second portion 28 which connects the adjacent edge 30 of the base 10 to the adjacent edge 32 of the other arm 20.

As shown in Figure 2, a printed circuit edge connector 34 comprises an insulated housing 36 receiving electrical terminals 38 which project into a hood 40 of the housing 36 for receiving an edge of a printed circuit board so that contact surfaces 32 of the terminals 38 engage opposite sides of said margin to make electrical contact with printed conductors thereon.

As best seen in Figure 3, the ends of the housing 36 have laterally projecting parts 44 each of which is formed with a slot 48 extending perpendicularly to the mating direction X of the connector 34. Before the connector 34 is supplied to the end user, or thereafter if the end user so desires, the clip 4 of a fastener 2 is slid over each projecting part 44 of the housing 36 so that the ears 16 of the clip 4 embrace the projection 44, as best seen in Figure 2, the strap 14 of the clip 4 engaging resiliently in the slot 48, whereby the fastener 2 is secured to a

housing 36 with the clip 6 extending rectilinearly in the mating direction X. Alternatively, the latching portion may be permanently deformable, by means of the assembly tooling, into the slot 48, for additional security. In  
5 this case, the strap may be flat, being defined by slots in the base of the first clip.

The contact surfaces 42 are soldered to further solder pads SP1 (a few of which are shown in Figure 3) on the board CB. The pads SP and SP1 are normally provided  
10 with solder thereon to facilitate the soldering operations.

With a fastener 2 so secured to each end of the connector 34, the end user mates the connector with a printed circuit board CB having formed in its margin M to  
15 be received in the hood 40 a pair of parallel slots S extending perpendicularly to the mating edge E of the board CB, a solder pad SP being provided on the board CB alongside each slot ST. As the connector 34 is being mated with the board CB, the edge portion EP of each slot  
20 ST, which portion carries the solder pad SP, is received between the arms 20 of the respective clip 6, one of which engages the edge EP. Heat can then be applied to solder each fastener to the board CB, by means of the solder pad SP so that the connector 34 is firmly fixed to the board  
25 CB. If required, the connector 34 can be detached from the board CB by disengaging the fasteners 4 from the projecting parts 44, and breaking the soldered connections.

An advantage of using the fasteners 2 to secure the  
30 connector 34 to the board CB is that the fasteners 2 provide strain relief for the soldered connections between the terminals 38, which are necessarily compliant, and the pads SP1. However, if particular security is not required, the arms 20 need not be soldered to the board  
35 CB.

CLAIMS

1. A stamped and formed metal fastener for mechanically securing an insulating housing of an electrical connector to a margin of a printed circuit board, the fastener comprising a first clip adapted to be engaged about a laterally projecting part of the housing and having a latching portion which can be resiliently or permanently deformed into an opening in said opening part to secure the clip to the housing; and a second clip extending rectilinearly from the first clip for insertion in a slot in said margin to grip an edge portion of the slot.
2. A fastener according to claim 1, wherein the first clip comprises a flat base, from opposite edges of which project curled-over ears for gripping said projecting part of the housing, the base being formed with a central resilient strap which constitutes said latching portion and which faces towards said ears.
3. A fastener according to claim 2, wherein the strap bridges a through opening in said base and extends transversely of the longitudinal axes of said ears which axes are parallel to one another and parallel to the second clip.
4. A fastener according to claim 2 or 3, wherein the second clip is of C-shaped cross section, having a pair of arms extending from opposite sides of a base portion of the second clip, for gripping the edge portion of the slot between them.
5. A fastener according to claim 4, wherein the first and second clips are connected by a transition portion of the fastener which connects adjacent ends of said ears and said arms and which tapers from the first clip towards the second clip.
6. An assembly comprising a printed circuit edge connector having an insulating housing, and a printed

circuit board, the housing using of the connector receiving a margin of the circuit board, the housing having at each end thereof, a laterally projecting part, each said projecting part being secured to said margin by means of a metal fastener comprising a first clip embracing and being secured to said projecting part by means of a latching portion of the first clip, which engages in an opening in said projecting part, the fastener further comprising a second clip formed integrally with the first clip and being of C-shaped cross section and thus comprising a pair of arms, the arms of each second clip engaging about an edge portion of a slot formed in said margin, at least one of said arms being soldered to said margin.

7. An assembly according to claim 6, wherein said opening is in the form of a slot extending perpendicularly to the mating direction of the connector and the circuit board and receiving a resilient strap projecting between the arms of said first clip, which arms embrace said projecting part.

8. A fastener for mechanically securing an insulating housing of an electrical connector to a margin of a printed circuit board, substantially as hereinbefore described with reference to the accompanying drawings.

9. An assembly comprising a printed circuit edge connector having an insulating housing, and a printed circuit board, the board and the connector housing being secured to each other, substantially as hereinbefore described with reference to the accompanying drawings.